The University of Jordan
Faculty of Science
Department of Physics

إسم الدكتور: _____

General Physics-2 (0302102)
2nd Summer Semester 2017
Second Exam

Student's Name (in Arabic): ..... No.: .....

Write the symbol of the best answer in the table on the last page. ***Only*** the table will be graded.

$k_e=1/4\pi\,\varepsilon_0=9\times10^9\ N\cdot m^2/C^2$, $m_e=9.11\times10^{-31}$ kg, $e=1.6\times10^{-19}$ C, $1eV=1.6\times10^{-19}$ J, $\varepsilon_0=8.854$ pF/m, $g=9.8\ m/s^2$.

(Answer's Table)

Question Number	Q.1	Q.2	Q.3	Q.4	Q.5	Q.6	Q.7	Q.8	Q.9	Q.10
Symbol of correct answer	D	A	A	B	C	D	E	A	C	C

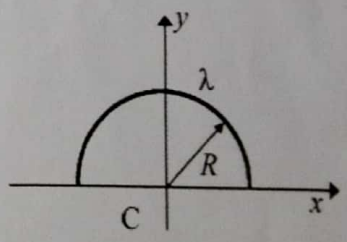
Q.1: A battery of an emf of 10 V and an internal resistance of 3Ω is connected to an external resistor. If the current in this circuit is 0.5 A, then the voltage across the terminals of this battery is:

A) 5.5 V B) 6.5 V C) 7.5 V D) 8.5 V E) zero

Q.2: A solid conducting sphere (radius = 5.0 cm) has a charge of 0.25 nC distributed uniformly on its surface. If point A is located at the center of the sphere and point B is 15 cm from the center, what is the magnitude of the electric potential difference between these two points?

A) 23 V B) 30 V C) 15 V D) 45 V E) 60 V

Q3: A charged glass rod is bent into the shape of a semicircle of radius R and has a uniform linear charge density of λ. The potential at point C at the center of the semicircle is equal to: (Let V = 0 at infinity)



A) $\lambda/(4\varepsilon_0)$ B) $\lambda/(4\pi\varepsilon_0 R)$ C) $-\lambda/(2\pi\varepsilon_0 R)$

D) $\lambda/(2\varepsilon_0)$ E) 0

Q4: A parallel plate capacitor with a capacitance of 12 μF is connected to a source of emf with a potential difference of 3 V. If a dielectric material of $\kappa = 4$ is inserted between the plates of the capacitor, then the change in the stored electrical energy is:

A) 5.4×10^{-5} J B) 1.2×10^{-5} J C) 1.6×10^{-4} J D) 1.4×10^{-6} J E) 0 J

Q.5: A certain wire has resistance R_1. The resistance of a second wire is R_2 and it is made of the same material as R_1. Given that the length $L_2=1/2\ L_1$ and the diameter $D_2=1/2\ D_1$ then the resistance is:

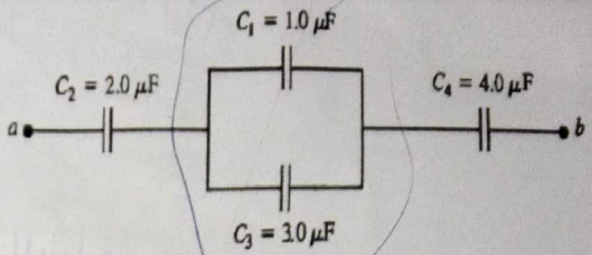
A) $R_2=2R_1$ B) $R_2=R_1$ C) $R_2=R_1/2$ D) $R_2=4R_1$ E) $R_2=R_1/4$

1 P = 1o⁻¹²

Q.6: The potential across the terminal *ab* in the adjacent figure is 1000 V. The magnitude of the charge on the equivalent capacitor is:

A) 100 μC B) 250 μC C) 750 μC

D) 1000 μC E) 50 μC



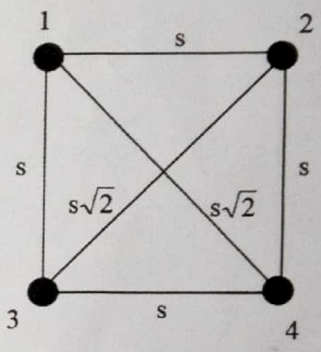
Q.7: A small bulb is rated at 7.5 W when operated at 125 V. The tungsten filament has a temperature coefficient of resistivity $\alpha = 4.5 \times 10^{-3}\ ^0C^{-1}$. When the filament is hot and glowing, its temperature is seven times the room temperature (20 ^{0}C). The resistance of the filament (in ohms) at room temperature is:

A) 1280 B) 1350 C) 1911 D) 4530 E) 5630

Q.8: The amount of energy required to assemble four identical point charges of magnitude Q at the corners of a square of side **s** is:

A) $k_eQ^2/2s$ B) k_eQ^2/s C) $4k_eQ^2/s$

D) $3k_eQ^2/2s$ E) $5.41\ k_eQ^2/s$



Q.9: The electric potential in a given region is $V = 5x - 3x^2y + 2yz^2$. The *z*-component of the electric field E_z is:

A) +4yz B) 5-6xy C) -4yz D) $3x^2$ E) $-3x^2$

Q.10: An air-filled parallel-plate capacitor has a capacitance of 1 pF. The plate separation is then doubled and a wax dielectric is inserted, completely filling the space between the plates. As a result, the capacitance becomes 2 pF. The dielectric constant of the wax is:

A) 2.0 B) 6.0 C) 1.0 D) 2.5 E) 4.0